

## SEQUENCE LISTING

<110> Aurisicchio, Luigi

La Monica, Nicola

Giannetti, Patrizia

Ciliberto, Gennaro

<120> SYNTHETIC GENE ENCODING RHESUS MONKEY

CARCINOEMBRYONIC ANTIGEN AND USES THEREOF

<130> ITR0058P

<150> PCT/EP2004/009239

<151> 2004-08-17

<150> 60/497,201

<151> 2003-08-22

<160> 3

<170> FastSEQ for Windows Version 4.0

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<211> 2118

<212> DNA

<213> Artificial Sequence

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<223> codon-optimized rhesus monkey CEA

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cgccccttca acgtggccga gggcaaggag gtgctgctgc tggcccacaa cgtgagccag 180  
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<210> 2

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<213> Macaca Mulatta

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      20              25              30
Thr Ala Gln Leu Thr Ile Glu Ser Arg Pro Phe Asn Val Ala Glu Gly
      35              40              45
Lys Glu Val Leu Leu Leu Ala His Asn Val Ser Gln Asn Leu Phe Gly
      50              55              60
Tyr Ile Trp Tyr Lys Gly Glu Arg Val Asp Ala Ser Arg Arg Ile Gly
      65              70              75              80
Ser Cys Val Ile Arg Thr Gln Gln Ile Thr Pro Gly Pro Ala His Ser
      85              90              95
Gly Arg Glu Thr Ile Asp Phe Asn Ala Ser Leu Leu Ile His Asn Val
      100             105             110
Thr Gln Ser Asp Thr Gly Ser Tyr Thr Ile Gln Val Ile Lys Glu Asp
      115             120             125
Leu Val Asn Glu Glu Ala Thr Gly Gln Phe Arg Val Tyr Pro Glu Leu
      130             135             140
Pro Lys Pro Tyr Ile Ser Ser Asn Asn Ser Asn Pro Val Glu Asp Lys
      145             150             155             160
Asp Ala Val Ala Leu Thr Cys Glu Pro Glu Thr Gln Asp Thr Thr Tyr
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Leu Trp Trp Val Asn Asn Gln Ser Leu Pro Val Ser Pro Arg Leu Glu
      180             185             190
Leu Ser Ser Asp Asn Arg Thr Leu Thr Val Phe Asn Ile Pro Arg Asn
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Asp Thr Thr Ser Tyr Lys Cys Glu Thr Gln Asn Pro Val Ser Val Arg
      210             215             220
Arg Ser Asp Pro Val Thr Leu Asn Val Leu Tyr Gly Pro Asp Ala Pro
      225             230             235             240
Thr Ile Ser Pro Leu Asn Thr Pro Tyr Arg Ala Gly Glu Asn Leu Asn
      245             250             255
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Glu Leu Pro Lys Pro Tyr Ile Thr Ser Asn Asn Ser Asn Pro Ile Glu		
325	330	335
Asp Lys Asp Ala Val Thr Leu Thr Cys Glu Pro Glu Thr Gln Asp Thr		
340	345	350
Thr Tyr Leu Trp Trp Val Asn Asn Gln Ser Leu Ser Val Ser Ser Arg		
355	360	365
Leu Glu Leu Ser Asn Asp Asn Arg Thr Leu Thr Val Phe Asn Ile Pro		
370	375	380
Arg Asn Asp Thr Thr Phe Tyr Glu Cys Glu Thr Gln Asn Pro Val Ser		
385	390	395
Val Arg Arg Ser Asp Pro Val Thr Leu Asn Val Leu Tyr Gly Pro Asp		
405	410	415
Ala Pro Thr Ile Ser Pro Leu Asn Thr Pro Tyr Arg Ala Gly Glu Asn		
420	425	430
Leu Asn Leu Ser Cys His Ala Ala Ser Asn Pro Ala Ala Gln Tyr Ser		
435	440	445
Trp Phe Val Asn Gly Thr Phe Gln Gln Ser Thr Gln Glu Leu Phe Ile		
450	455	460
Pro Asn Ile Thr Val Asn Asn Ser Gly Ser Tyr Met Cys Gln Ala His		
465	470	475
Asn Ser Ala Thr Gly Leu Asn Arg Thr Thr Val Thr Ala Ile Thr Val		
485	490	495
Tyr Val Glu Leu Pro Lys Pro Tyr Ile Ser Ser Asn Asn Ser Asn Pro		
500	505	510
Ile Glu Asp Lys Asp Ala Val Thr Leu Thr Cys Glu Pro Val Ala Glu		
515	520	525
Asn Thr Thr Tyr Leu Trp Trp Val Asn Asn Gln Ser Leu Ser Val Ser		
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Pro Arg Leu Gln Leu Ser Asn Gly Asn Arg Ile Leu Thr Leu Leu Ser		
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Val Thr Arg Asn Asp Thr Gly Pro Tyr Glu Cys Gly Ile Gln Asn Ser		
565	570	575

Glu Ser Ala Lys Arg Ser Asp Pro Val Thr Leu Asn Val Thr Tyr Gly  
 580 585 590  
 Pro Asp Thr Pro Ile Ile Ser Pro Pro Asp Leu Ser Tyr Arg Ser Gly  
 595 600 605  
 Ala Asn Leu Asn Leu Ser Cys His Ser Asp Ser Asn Pro Ser Pro Gln  
 610 615 620  
 Tyr Ser Trp Leu Ile Asn Gly Thr Leu Arg Gln His Thr Gln Val Leu  
 625 630 635 640  
 Phe Ile Ser Lys Ile Thr Ser Asn Asn Ser Gly Ala Tyr Ala Cys Phe  
 645 650 655  
 Val Ser Asn Leu Ala Thr Gly Arg Asn Asn Ser Ile Val Lys Asn Ile  
 660 665 670  
 Ser Val Ser Ser Gly Asp Ser Ala Pro Gly Ser Ser Gly Leu Ser Ala  
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<210> 3

<211> 705

<212> PRT

<213> Macaca Mulatta

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 Thr Ala Gln Leu Thr Ile Glu Ser Arg Pro Phe Asn Val Ala Glu Gly  
 35 40 45  
 Lys Glu Val Leu Leu Leu Ala His Asn Val Ser Gln Asn Leu Phe Gly  
 50 55 60  
 Tyr Ile Trp Tyr Lys Gly Glu Arg Val Asp Ala Ser Arg Arg Ile Gly  
 65 70 75 80  
 Ser Cys Val Ile Arg Thr Gln Gln Ile Thr Pro Gly Pro Ala His Ser

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Gly Arg Glu Thr Ile Asp Phe Asn Ala Ser Leu Leu Ile His Asn Val					
	100		105		110
Thr Gln Ser Asp Thr Gly Ser Tyr Thr Ile Gln Val Ile Lys Glu Asp					
	115		120		125
Leu Val Asn Glu Glu Ala Thr Gly Gln Phe Arg Val Tyr Pro Glu Leu					
	130		135		140
Pro Lys Pro Tyr Ile Ser Ser Asn Asn Ser Asn Pro Val Glu Asp Lys					
	145		150		155
Asp Ala Val Ala Leu Thr Cys Glu Pro Glu Thr Gln Asp Thr Thr Tyr					
	165		170		175
Leu Trp Trp Val Asn Asn Gln Ser Leu Pro Val Ser Pro Arg Leu Glu					
	180		185		190
Leu Ser Ser Asp Asn Arg Thr Leu Thr Val Phe Asn Ile Pro Arg Asn					
	195		200		205
Asp Thr Thr Ser Tyr Lys Cys Glu Thr Gln Asn Pro Val Ser Val Arg					
	210		215		220
Arg Ser Asp Pro Val Thr Leu Asn Val Leu Tyr Gly Pro Asp Ala Pro					
	225		230		235
Thr Ile Ser Pro Leu Asn Thr Pro Tyr Arg Ala Gly Glu Asn Leu Asn					
	245		250		255
Leu Thr Cys His Ala Ala Ser Asn Pro Thr Ala Gln Tyr Phe Trp Phe					
	260		265		270
Val Asn Gly Thr Phe Gln Gln Ser Thr Gln Glu Leu Phe Ile Pro Asn					
	275		280		285
Ile Thr Val Asn Asn Ser Gly Ser Tyr Met Cys Gln Ala His Asn Ser					
	290		295		300
Ala Thr Gly Leu Asn Arg Thr Thr Val Thr Ala Ile Thr Val Tyr Ala					
	305		310		315
Glu Leu Pro Lys Pro Tyr Ile Thr Ser Asn Asn Ser Asn Pro Ile Glu					
	325		330		335
Asp Lys Asp Ala Val Thr Leu Thr Cys Glu Pro Glu Thr Gln Asp Thr					
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Thr Tyr Leu Trp Trp Val Asn Asn Gln Ser Leu Ser Val Ser Ser Arg					
	355		360		365
Leu Glu Leu Ser Asn Asp Asn Arg Thr Leu Thr Val Phe Asn Ile Pro					
	370		375		380

Arg	Asn	Asp	Thr	Thr	Phe	Tyr	Glu	Cys	Glu	Thr	Gln	Asn	Pro	Val	Ser
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Leu	Asn	Leu	Ser	Cys	His	Ala	Ala	Ser	Asn	Pro	Ala	Ala	Gln	Tyr	Phe
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Trp	Phe	Val	Asn	Gly	Thr	Phe	Gln	Gln	Ser	Thr	Gln	Glu	Leu	Phe	Ile
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Pro	Asn	Ile	Thr	Val	Asn	Asn	Ser	Gly	Ser	Tyr	Met	Cys	Gln	Ala	His
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Asn	Ser	Ala	Thr	Gly	Leu	Asn	Arg	Thr	Thr	Val	Thr	Ala	Ile	Thr	Val
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Tyr	Val	Glu	Leu	Pro	Lys	Pro	Tyr	Ile	Ser	Ser	Asn	Asn	Ser	Asn	Pro
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Ile	Glu	Asp	Lys	Asp	Ala	Val	Thr	Leu	Thr	Cys	Glu	Pro	Val	Ala	Glu
		515						520						525	
Asn	Thr	Thr	Tyr	Leu	Trp	Trp	Val	Asn	Asn	Gln	Ser	Leu	Ser	Val	Ser
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Pro	Arg	Leu	Gln	Leu	Ser	Asn	Gly	Asn	Arg	Ile	Leu	Thr	Leu	Leu	Ser
545					550					555					560
Val	Thr	Arg	Asn	Asp	Thr	Gly	Pro	Tyr	Glu	Cys	Gly	Ile	Gln	Asn	Ser
				565					570					575	
Glu	Ser	Ala	Lys	Arg	Ser	Asp	Pro	Val	Thr	Leu	Asn	Val	Thr	Tyr	Gly
			580						585					590	
Pro	Asp	Thr	Pro	Ile	Ile	Ser	Pro	Pro	Asp	Leu	Ser	Tyr	Arg	Ser	Gly
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Ala	Asn	Leu	Asn	Leu	Ser	Cys	His	Ser	Asp	Ser	Asn	Pro	Ser	Pro	Gln
		610					615						620		
Tyr	Ser	Trp	Leu	Ile	Asn	Gly	Thr	Leu	Arg	Gln	His	Thr	Gln	Val	Leu
625					630					635					640
Phe	Ile	Ser	Lys	Ile	Thr	Ser	Asn	Asn	Asn	Gly	Ala	Tyr	Ala	Cys	Phe
				645					650					655	
Val	Ser	Asn	Leu	Ala	Thr	Gly	Arg	Asn	Asn	Ser	Ile	Val	Lys	Asn	Ile
			660						665					670	
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675 680 685  
Arg Ala Thr Val Gly Ile Ile Ile Gly Met Leu Val Gly Val Ala Leu  
690 695 700  
Met  
705